

Article

Social class, gender, and time use: Implications for the social determinants of body weight?

by Lindsay McLaren, Jenny Godley and Ian A.S. MacNairn

November, 2009



Statistics
Canada

Statistique
Canada

Canada

Social class, gender, and time use: Implications for the social determinants of body weight?

by Lindsay McLaren, Jenny Godley and Ian A.S. MacNairn

Abstract

Background

The social gradient in body weight (for example, obesity) departs from the social gradient in other health outcomes. Innovative approaches are needed to understand the observed patterns. This study examines time-use patterns by indicators of socio-economic position, and considers the implications of variations in time use for the social gradient in weight reported in other studies.

Data and methods

The data are from respondents aged 25 to 64 to Canada's 1986 and 2005 General Social Surveys, which focused on time use. Participation in various activities was examined by sex, and by personal income and education, stratified by sex, in both years.

Results

Higher-income men and women were more likely than those of lower income to spend time in paid work, commuting and eating out, and less likely to spend time sleeping. Men and women with higher education were more likely than those with lower education to spend time in physical activity (2005 only) and reading. These time-use patterns plausibly contribute to the social gradient in obesity reported in other Canadian studies.

Interpretation

The findings suggest that there is value in looking beyond a narrow range of health behaviours toward broader measures of daily routines to gain insight into the social determinants of weight and health.

Keywords

gender, obesity, population, social class, time use, trends

Authors

Lindsay McLaren (1-403-210-9424, lmclaren@ucalgary.ca) is with the Department of Community Health Sciences at the University of Calgary, 3330 Hospital Dr. NW, Calgary AB, T2N 4N1. Jenny Godley is with the Department of Sociology, and at the time of writing, Ian A.S. MacNairn was in the Bachelor of Health Sciences Program at the University of Calgary.

The social gradient in health refers to the consistent association between socio-economic position and health status, whereby higher socio-economic position is associated with better health status across an array of health outcomes.¹⁻⁴ The social gradient in body weight (body mass index (BMI), obesity) departs from this consistent pattern. Sex differences are apparent, with an inverse association (higher socio-economic position—lower BMI) more prominent for women than men.⁵ Further differences by indicator of socio-economic position are evident; for example, recent Canadian data show a positive association with income for men (that is, higher income—higher likelihood of overweight/obesity) that is not observed in women, while an inverse association between education and overweight/obesity has been observed for both women and (less consistently) for men.⁶⁻⁸

Several studies have examined mediators of the association between socio-economic position and BMI/obesity.^{7,9,10} In general, these studies have focused on a limited range of health behaviours with plausible biological links to weight, such as diet, physical activity, and smoking. One study found that women of higher socio-economic position reported

more physical activity and higher fruit/vegetable intake, which helped explain their lower obesity risk.⁷ Other studies found that higher-income men reported a lower likelihood of smoking⁹ and less physical activity,⁷ which helped to explain their higher obesity risk. On the other hand, a longitudinal study found that the association between social class

in childhood and obesity in adulthood was not attenuated by health behaviours in adulthood (for example, smoking, diet, physical activity).¹¹

To build on the contribution of these studies, this analysis examines the association between socio-economic position (personal income, education) and a broader array of activities (overall daily routines or lifestyles), and considers the implications for the social gradient of weight reported in other studies. The period during which obesity prevalence increased markedly in Canada⁶ has been characterized by social change that is not necessarily captured in measurements of a limited range of health behaviours. The past several decades have seen changes in population composition (for example, some adults are now caring for both children and elderly parents), availability and use of technology (for example, the ubiquity of computers), gender roles (for example, the increasing participation of women in the paid labour force), and the size and structure of cities (for example, time spent travelling, usually by car).^{12,13} It is plausible that these trends have implications for the social gradient in body weight, and the aim of this article is to explore this possibility using *time use* data.

The approach is in line with a sociological view of lifestyle¹⁴ that includes the daily choices made by individuals within a context that is socially, culturally and economically constrained. Body weight is one manifestation of class-based inequality that plausibly reflects these everyday processes. A useful theoretical framework for the intersection of class and lifestyle as it pertains to body weight is that of Bourdieu, and in particular, his concept of *habitus*.¹⁵⁻¹⁸ *Habitus* refers to the embodiment of social structures in individuals such that the body (appearance, style, behavioural affinities, etc.) is a social metaphor for status. According to this framework, class incorporates an individual's standing on several dimensions of capital: economic capital (income, wealth), cultural capital (accumulated educational or experiential

resources and associated dispositions), and social capital (resources derived from social relationships and engagement).^{17,19} These forms of capital can take on symbolic value when they are recognized by society as having prestige or legitimacy.

The nuances observed in the social gradient in weight (variations by sex and by indicators of socio-economic position) likely reflect not just economic circumstances (such as the ability to afford nutritious foods),^{20,21} but also social dimensions (for example, implications of social engagement and connections for appearance and weight)²² cultural dimensions (for example, affinity for specific standards of weight/health; sense of control/empowerment)^{23,24} and symbolic dimensions (for example, attributes of the socially desirable body, which differ for men and women).⁸ These processes and forms of capital are reflected in how people spend their time. By examining time use data, it is possible to explore a wide range of activities such as time spent in paid work, reading, cultural events, and civic or voluntary activities. These activities may reflect, and/or contribute to one's economic, cultural, and social capital. As well, they may be related to weight in a variety of ways (Appendix Table A)—directly, through increased caloric

intake or decreased physical exertion, and indirectly, through pathways such as social norms that encourage a particular appearance or set of values toward weight.²⁵⁻²⁷ Daily activities may also be associated with weight through biological pathways. For example, changes in thyroid-stimulating hormone secretion that accompany sleep debt may lead to weight gain.²⁹ Activation of the hypothalamic-pituitary-adrenal axis and the sympathetic nervous system in response to psychosocial stress, such as that experienced by people with a lower socio-economic position,³⁰ may also lead to weight gain.³¹ These direct and indirect pathways between lifestyle and weight are not mutually exclusive, nor is this an exhaustive list.

The purpose of this study is to examine variations in time spent in different activities, by two conventional indicators of socio-economic position: personal income and education. Although the data source does not contain information about body weight, it has notable advantages: 1) the ability to tap into a much broader array of daily activities than has been examined in other studies of this topic, and 2) greater measurement validity than other forms of self-report for the assessment of behaviours.^{32,33} The results are interpreted with reference to data on the social gradient in weight, as reported in other Canadian studies (Text Table 1). In particular, an attempt is made to identify lifestyle patterns that may help explain an association between education and BMI/obesity that is consistently inverse for women, and that is inverse, but less consistently so, for men; and an association between income and BMI/obesity that recent Canadian studies suggest is positive for men, and curvilinear (perhaps in transition) for women.

Data and methods

The data are from the public use files of Statistics Canada's General Social Survey, a cross-sectional telephone survey that has been conducted approximately every year since 1985. Details are available at

Text Table 1
Association between income/
education and body mass index/
obesity among Canadian men and
women, based on recent studies

Variables	Nature of association
Income and body mass index/obesity	
Men	Currently positive; ^{15,18} previously inverse; ²⁵ or nonsignificant ¹
Women	Currently curvilinear ¹ or nonsignificant, ¹ though tending toward inverse; ² previously inverse ²
Education and body mass index/obesity	
Men	Inverse, currently ¹⁵ and in past, ¹ but less consistent than in women ¹
Women	Inverse, currently ¹⁵ and in past ¹

¹ unpublished (McLaren L, Auld CM, Godley J, Still D, Gauvin L. Examining the association between socioeconomic position and body mass index in 1978 and 2005 among Canadian working-age women and men)

www.statcan.gc.ca. Briefly, the target population is household residents aged 15 or older in the ten provinces; residents of the territories and full-time residents of institutions are excluded. A stratified cluster sampling approach with random-digit dialing was employed.

This study concerns working-age (25 to 64) respondents to two survey cycles that had time use as the core topic: cycle 2 (1986) and cycle 19 (2005).

Personal income and highest attained education were used as indicators of socioeconomic position. Personal income, adjusted for inflation with the Bank of Canada's online inflation calculator, was grouped into three categories as equal in size as possible across the two cycles. Categories were created separately for men and women to reflect their different income distributions (women's income was lower than men's, particularly in 1986). The income groups for men were: lower (\$0 to \$18,363 in 1986, and \$0 to \$29,999 in 2005), middle (\$18,364 to \$30,605 in 1986, and \$30,000 to \$49,999 in 2005), and higher (\$30,606 or more in 1986, and \$50,000 or more in 2005). The income groups for women were: lower (\$0 to \$6,120 in 1986, and \$0 to \$9,999 in 2005), middle (\$6,121 to \$18,363 in 1986, and \$10,000 to \$29,999 in 2005), and higher (\$18,364 or more in 1986, and \$30,000 or more in 2005).

Two educational attainment categories were defined: university degree (bachelor's or higher) versus less than university degree. A five-category breakdown was also considered, but the university degree/less than university degree dichotomy captured the main findings.

The 1986 core sample contained 6,705 respondents aged 25 to 64, 6,584 of whom (98.2%) provided time-use data ($n=3,007$ men and $n=3,577$ women). Income data were missing for 731 men (24.3%) and 815 women (22.8%). Men with missing income data in 1986 spent ($p<0.05$) more time in paid work and personal care, and less time in household work and food preparation/meals at home than did men with complete income data. Women with missing income data in

1986 spent ($p<0.05$) more time sleeping, and less time caregiving and socializing than did women with complete income data. Education data were missing for 34 men (1.1%).

The 2005 sample contained 13,519 respondents aged 25 to 64, all of whom provided time-use data ($n=6,006$ men and $n=7,513$ women). Income data were missing for 1,174 men (19.5%) and 1,661 women (22.1%). Men with missing income data in 2005 spent ($p<0.05$) more time in personal activities, sleeping and other, and less time in household work, food preparation/meals at home, caregiving and civic/voluntary activities than did men with complete income data. Women with missing income data in 2005 spent ($p<0.05$) more time in food preparation/meals at home, personal care and sleep, and less time commuting, eating out and attending entertainment than did women with complete income data. Education data were missing for 68 men (1.1%) and 76 women (1.0%). Those with missing data were excluded from analyses involving income and education.

Time spent (minutes) in various activities was derived from a time use diary (details are available at www.statcan.gc.ca). Respondents were asked to consecutively report their daily activities during a 24-hour reference period starting at 4:00 a.m. They identified the main activity in which they were engaged and the start and end time of that activity. All seven days of the week were represented, with days assigned randomly to respondents. The information from the diary was coded at Statistics Canada ($n=99$ codes in 1986 and $n=182$ codes in 2005, representing individual activities). Based on cross-cycle concordance tables, 17 groupings of codes that were comparable in 1986 and 2005 were created (Appendix Table A). On average, these groupings accounted for 92.7% of the 24-hour period in 1986 and 94.8% in 2005. The remaining time—7.3% in 1986 and 5.2% in 2005—was comprised of time for which no activity was reported or codes for which two or more individual

activities of interest were conflated (for example, "other media/communication" contained elements that fit in both "computer and television" and "less physically active leisure," which were examined separately in this analysis). The diversity of activities increased during the 20 years. Consequently, 1986 and 2005 groupings are not identical, but are as comparable as possible while still allowing for real change in how people spend their time.

Because the time-use variables were heavily skewed (positive skew with a large number of zero values), binary logistic regression with zero time spent as the reference was used. The exception was sleep, the reference category for which was the bottom tertile of the distribution of time spent. Multinomial logistic regression with time use presented as three- and four-category outcomes was also run, but the binary outcome captured the main findings. For each activity group, time use (zero, more than zero) was first regressed on sex. Time use (zero, more than zero) was then regressed on personal income and education (in the same model) for each activity group, stratified by sex. (Although three personal income categories were examined, for ease of presentation, comparisons between the highest and lowest are shown.) Stata/IC version 10.1 software was used. Appropriate sampling weights were applied in all analyses, as directed in the General Social Survey user guides.

Results

Narrowing the gender gap?

Time-use data for men and women in 1986 and 2005 convey a general sense of changes in lifestyle over the two decades (Table 1). Because the time-use groupings in the two surveys were not identical, between-survey statistical tests could not be conducted. Instead, change over time was examined, based on an arbitrary change value of 25%.

Among men, average daily time increased for household work (48 to 65 minutes), food preparation/meals at home

Table 1
Average minutes spent in 24-hour period, by activity and sex, household population aged 25 to 64, Canada excluding territories, 1986 and 2005

Activity	Men						Women					
	1986 (n=3,007)			2005 (n=6,006)			1986 (n=3,577)			2005 (n=7,513)		
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
Paid work	305.2	266.8	0 to 1,440	315.6	283.7	0 to 1,400	157.4	223.2	0 to 1,125	209.9 ¹	250.8	0 to 1,335
Commuting	30.4	45.4	0 to 690	32.9	52.5	0 to 1,080	14.8	30.7	0 to 570	21.7 ¹	42.6	0 to 1,045
Household work	47.7	103.8	0 to 975	65.2 ¹	121.5	0 to 880	88.9	108.4	0 to 750	101.2	130.0	0 to 1,260
Food preparation/Meals at home	17.2	35.5	0 to 480	27.1 ¹	40.9	0 to 570	83.8	79.6	0 to 740	56.9 ¹	60.4	0 to 990
Restaurant meals/Eating out	28.6	47.4	0 to 750	23.5	43.1	0 to 780	19.4	37.5	0 to 370	21.0	45.2	0 to 910
Shopping/Services	45.3	94.0	0 to 675	36.3	78.9	0 to 1,245	66.6	102.0	0 to 770	56.7	90.6	0 to 1,110
Caregiving	19.3	58.0	0 to 715	24.2 ¹	64.2	0 to 860	49.7	96.1	0 to 930	49.5	106.2	0 to 1,080
Civic, voluntary, religious activities	13.2	65.2	0 to 1,080	18.8 ¹	76.2	0 to 935	18.9	68.3	0 to 930	22.9	76.5	0 to 1,005
School/Education	13.8	78.0	0 to 1,005	10.1 ¹	67.3	0 to 975	14.1	71.1	0 to 855	12.6	72.3	0 to 1,075
Personal activities and care	54.2	72.4	0 to 1,440	50.3	65.2	0 to 1,080	64.8	75.3	0 to 1,440	60.5	69.6	0 to 1,035
Sleep	483.3	140.7	0 to 1,440	489.2	125.3	0 to 1,440	496.3	128.3	0 to 1,440	502.5	119.5	0 to 1,440
Socializing	51.4	111.8	0 to 810	53.7	113.2	0 to 1,065	56.7	110.7	0 to 830	58.5	112.9	0 to 1,075
Entertainment (attend)	6.0	33.2	0 to 660	7.5	45.4	0 to 745	5.6	30.2	0 to 665	7.3 ¹	42.9	0 to 845
Leisure (physically active)	19.1	64.7	0 to 793	28.0 ¹	75.3	0 to 855	9.9	36.2	0 to 660	22.5 ¹	59.1	0 to 1,075
Leisure (less physically active)	25.2	59.6	0 to 670	19.7	61.1	0 to 840	43.1	81.5	0 to 645	21.6 ¹	59.2	0 to 1,245
Television/Computer	150.6	146.3	0 to 990	146.4	147.7	0 to 1,305	122.1	126.3	0 to 885	118.6	126.5	0 to 1,410
Reading	25.7	57.1	0 to 765	16.0 ¹	44.1	0 to 540	22.5	51.6	0 to 600	21.1	52.8	0 to 900
Other	103.8	89.4	0 to 915	75.5 ¹	77.7	0 to 1,225	105.4	83.3	0 to 1,215	74.9 ¹	72.9	0 to 1,140

¹ greater than 25% increase in mean number of minutes between 1986 and 2005

² greater than 25% decrease in mean number of minutes between 1986 and 2005

SD = standard deviation

Note: Mean values include those who reported zero time spent on each activity.

Source: 1986 and 2005 General Social Surveys.

Table 2
Odds ratios for women's participation in selected activities compared with men, household population aged 25 to 64, Canada excluding territories, 1986 and 2005

Activity	1986 (n=6,584)			2005 (n=13,519)		
	Odds ratio ¹	95% confidence interval		Odds ratio ¹	95% confidence interval	
		from	to		from	to
Paid work	0.35*	0.31	0.40	0.55*	0.50	0.60
Commuting	0.39*	0.35	0.45	0.58*	0.54	0.63
Household work	4.10*	3.60	4.60	2.80*	2.60	3.10
Food preparation/Meals at home	9.10*	7.80	10.60	3.00*	2.70	3.30
Restaurant meals/Eating out	0.54*	0.47	0.61	0.71*	0.65	0.78
Shopping/Services	1.80*	1.60	2.00	1.80*	1.70	2.00
Caregiving	2.60*	2.30	3.00	1.60*	1.50	1.80
Civic, voluntary, religious activities	1.80*	1.40	2.20	1.40*	1.20	1.60
School/Education	1.50*	1.20	1.90	1.50*	1.20	1.80
Personal activities and care	1.50*	1.20	1.80	1.30*	1.20	1.50
Sleep ²	1.40*	1.20	1.60	1.30*	1.10	1.40
Socializing	1.30*	1.20	1.50	1.30*	1.20	1.40
Entertainment (attending)	1.01	0.74	1.40	1.10	0.88	1.30
Leisure (physically active)	0.73*	0.61	0.88	1.10	0.96	1.20
Leisure (less physically active)	1.80*	1.60	2.10	1.30*	1.20	1.40
Television/Computer	0.75*	0.65	0.87	0.77*	0.70	0.85
Reading	0.95	0.83	1.10	1.30*	1.20	1.50
Other	1.20	0.77	1.80	1.10	0.92	1.20

¹ reference category is men

² comparison is with bottom tertile of distribution of time spent sleeping

* significantly different from estimate for men ($p < 0.01$)

Source: 1986 and 2005 General Social Surveys.

(17 to 27 minutes), caregiving (19 to 24 minutes), civic/voluntary activities (13 to 19 minutes) and physically active leisure (19 to 28 minutes). Men's average time decreased for school/education (14 to 10 minutes) and reading (26 to 16 minutes). The time that men spent in paid work (305 versus 316 minutes) and commuting (30 versus 33 minutes) did not change substantially.

Over the same period, among women, average time increased for paid work (157 to 210 minutes), commuting (15 to 22 minutes) and physically active leisure (10 to 23 minutes). Women's average time decreased for food preparation/meals at home (84 to 57 minutes) and less physically active leisure (43 to 22 minutes).

Sex differences persist

Despite substantial changes in the amount of time devoted to specific activities over the 20-year period, sex differences persisted (Table 2). In both 1986 and 2005, women were significantly less likely than men to spend time in paid

Table 3
Odds ratios relating participation in selected activities to personal income and education, by sex, household population aged 25 to 64, Canada excluding territories, 1986 and 2005

Activity (1986 time-use variable)	Higher income ¹ (adjusted for education)						University degree ¹ (adjusted for income)					
	1986			2005			1986			2005		
	Odds ratio	95% confidence interval		Odds ratio	95% confidence interval		Odds ratio	95% confidence interval		Odds ratio	95% confidence interval	
		from	to		from	to		from	to		from	to
Paid work												
Men	3.70**	2.80	5.00	2.70**	2.20	3.20	1.20	0.83	1.60	1.00	0.85	1.20
Women	12.20**	9.10	16.30	8.30**	6.70	10.40	0.88	0.61	1.30	1.00	0.86	1.20
Commuting												
Men	3.50**	2.60	4.60	2.70**	2.20	3.20	1.20	0.90	1.70	0.88	0.75	1.04
Women	15.60**	11.40	21.40	9.30**	7.30	11.80	0.68*	0.47	0.97	0.94	0.81	1.10
Household work												
Men	0.87	0.65	1.10	1.10	0.96	1.40	1.02	0.75	1.40	0.89	0.76	1.04
Women	0.38**	0.29	0.50	0.56**	0.45	0.66	0.91	0.65	1.30	0.88	0.75	1.02
Meals at home												
Men	0.72*	0.55	0.95	0.86	0.72	1.03	1.60**	1.20	2.10	1.20	0.99	1.40
Women	0.27**	0.18	0.40	0.56**	0.45	0.69	0.70	0.43	1.10	0.92	0.78	1.10
Eating out												
Men	2.30**	1.70	3.00	2.00**	1.60	2.40	1.30	0.96	1.70	0.96	0.82	1.10
Women	6.00**	4.50	7.90	3.90**	3.10	4.80	0.95	0.68	1.30	1.10	0.91	1.20
Shopping/Services												
Men	1.10	0.83	1.50	0.91	0.75	1.10	1.90**	1.40	2.60	1.30**	1.10	1.50
Women	0.95	0.74	1.20	0.99	0.84	1.20	1.20	0.87	1.70	1.10	0.92	1.20
Caregiving												
Men	1.50*	1.05	2.00	1.50**	1.20	1.80	1.70**	1.30	2.40	1.20	0.98	1.40
Women	0.56**	0.43	0.72	0.56**	0.47	0.66	1.60**	1.20	2.30	1.30**	1.10	1.50
Civic/Voluntary												
Men	1.30	0.73	2.30	1.00	0.76	1.30	0.75	0.41	1.40	1.10	0.88	1.40
Women	0.48*	0.27	0.88	0.78*	0.62	0.96	1.80	0.89	3.80	0.80*	0.66	0.97
School/Education												
Men	0.54*	0.30	0.97	0.24**	0.15	0.39	4.60**	2.70	7.80	2.40**	1.50	3.60
Women	1.10	0.70	1.80	0.51**	0.34	0.75	2.70**	1.40	5.20	2.60**	1.90	3.50
Personal activities												
Men	1.50	0.98	2.40	1.40*	1.10	1.70	1.80*	1.10	3.10	1.10	0.88	1.40
Women	3.30**	2.00	5.30	2.00**	1.60	2.50	1.20	0.64	2.10	0.90	0.72	1.10
Sleep²												
Men	0.55**	0.41	0.74	0.60**	0.50	0.74	0.87	0.64	1.20	1.10	0.94	1.30
Women	0.61**	0.47	0.81	0.52**	0.43	0.64	1.10	0.80	1.60	1.10	0.95	1.30
Socializing												
Men	0.76	0.57	1.01	0.96	0.79	1.20	0.89	0.65	1.20	0.88	0.74	1.04
Women	0.61**	0.47	0.80	0.79**	0.67	0.94	1.30	0.87	1.80	1.00	0.88	1.20
Entertainment (attend)												
Men	3.30**	1.40	7.40	1.70*	1.10	2.70	1.40	0.73	2.50	1.30	0.90	1.90
Women	1.30	0.70	2.30	1.20	0.77	1.80	0.79	0.39	1.60	1.20	0.89	1.70
Physically active leisure												
Men	0.94	0.65	1.30	1.10	0.92	1.40	1.40	0.96	2.10	1.50**	1.20	1.80
Women	0.54**	0.36	0.79	1.20	0.95	1.40	1.50	0.95	2.30	1.30**	1.10	1.60
Other leisure												
Men	0.77	0.57	1.03	0.71**	0.57	0.88	1.50*	1.10	2.00	1.30*	1.05	1.50
Women	0.56**	0.42	0.73	0.66**	0.55	0.80	1.60*	1.10	2.20	1.20	0.99	1.40
Television/Computer												
Men	0.99	0.75	1.40	0.77*	0.62	0.97	0.56**	0.41	0.78	0.87	0.72	1.10
Women	0.60**	0.46	0.78	0.80*	0.65	0.98	0.78	0.56	1.10	0.74**	0.63	0.87
Reading												
Men	1.50**	1.10	2.00	0.87	0.70	1.10	1.50**	1.10	2.10	2.30**	1.90	2.80
Women	1.04	0.79	1.40	0.91	0.75	1.10	2.00**	1.40	2.70	1.60**	1.40	1.90
Other												
Men	0.98	0.41	2.30	0.91	0.65	1.30	1.20	0.41	3.50	1.30	0.97	1.80
Women	0.17**	0.07	0.44	0.84	0.61	1.10	1.40	0.55	3.80	1.20	0.92	1.60

¹ lowest category is reference (lower-income group, less than university degree)

² comparison is with bottom tertile of distribution of time spent sleeping

* significantly different from estimate for reference category ($p < 0.05$)

** significantly different from estimate for reference category ($p < 0.01$)

Notes: In 1986, of the 2,253 men, 33.6% (n=760) were in the higher-income group, 35.3% (798) were in the middle-income group (not shown), and 31.2% (n=705) were in the lower-income group, 16.2% (n=366) had a university degree or more, and 83.8% (n=1,897) had less than a university degree. Of the 2,754 women, 25.6% (n=733) were in the higher-income group, 31.6% (871) were in the middle-income group (not shown), and 41.8% (n=1,150) were in the lower-income group, 12.8% (n=351) had a university degree or more, and 87.3% (n=2,403) had less than a university degree. In 2005, of the 4,827 men, 45.6% (n=2,203) were in the higher-income group, 29.9% (n=1,445) were in the middle-income group (not shown), and 24.4% (n=1,179) were in the lower-income group, 28.1% (n=1,358) had a university degree or more, and 71.9% (n=3,469) had less than a university degree. Of the 5,842 women, 48.2% (n=2,816) were in the higher-income group, 32.8% (n=1,916) were in the middle-income group (not shown), and 19.0% (n=1,110) were in the lower-income group, 28.5% (n=1,664) had a university degree or more, and 71.5% (n=4,178) had less than a university degree.

Source: 1986 and 2005 General Social Surveys.

What is already known on this subject?

- The social gradient in body weight departs from the social gradient in other health outcomes, showing variation by sex and by aspect of socio-economic position.
- Studies of the social gradient in weight have tended to focus on health behaviours with obvious links to body weight.
- The period during which obesity prevalence has risen has been characterized by social changes that may not be captured by a narrow range of health behaviours.

What does this study add?

- Higher-income men and women were more likely than those with lower incomes to spend time in paid work, eating out and commuting, and less likely to spend time sleeping.
- Men and women with university degrees were more likely than those who were not university graduates to spend time in physical activity and reading.
- The findings demonstrate the value of adopting a broader view of lifestyle in research on the social drivers of health outcomes; time-use data offer a useful tool for this task.

work, commuting, eating out and television/computer use. They were more likely than men to spend time in household work, food preparation/meals at home, shopping/services, caregiving, civic/voluntary activities, school/education, personal activities, sleep, socializing and less physically active leisure.

While women were not as likely as men to report physically active leisure in 1986, by 2005 the difference was

not significant. And in 2005, women were more likely than men to spend time reading, a difference that was not observed in 1986.

Income and education

The results of binary logistic regression reveal several consistent associations between men's time use and their income and education (Table 3). In both 1986 and 2005, with the effects of educational attainment taken into account, higher-income men were more likely than lower-income men to spend time in paid work, commuting, eating out and attending entertainment events, and less likely to spend time sleeping. For example, the odds that higher-income men would spend time in paid work and commuting were more than three and a half times greater than the odds for lower-income men in 1986, and more than two and a half times greater in 2005. In both years, higher-income men had twice the odds of eating out, compared with lower-income men. Spending time watching television/using the computer was negatively associated with education in 1986 and with income in 2005. Physical activity was not associated with income or education for men in 1986, but was positively associated with education in 2005.

Consistencies over the 20-years period were also evident among women (Table 3). In 1986 and 2005, higher-income women were significantly more likely than lower-income women to spend time in paid work, commuting, eating out and personal activities, and less likely to spend time sleeping, doing household work, meals at home and socializing, with level of education taken into account. For example, in 1986, higher-income women's odds of spending time in paid work were 12 times greater than those of lower-income women, and in 2005, 8 times greater. Similarly, the odds of commuting among higher-income women were more than 15 times as great as the odds for lower-income women in 1986, and about 9 times greater in 2005. As well, the odds that higher-income women would spend time eating

out were 6 times those of lower-income women in 1986, and 4 times greater in 2005. In both years, women's odds of spending time caregiving were positively associated with education and negatively associated with income. Women's odds of spending time reading were positively associated with education (but not income) in 1986 and 2005. Their odds of watching television/using the computer were negatively associated with income in both 1986 and 2005, and with education in 2005. Spending time in physically active leisure was negatively associated with women's income in 1986, but positively associated with their education in 2005.

Discussion

This analysis examines how women and men spent their time in 1986 and 2005, by personal income and education, in order to detect lifestyle patterns that may contribute to understanding the social gradient of body weight.

A comparison of 1986 and 2005 data reveals that the gender division in time use was tempered somewhat by change over time. For instance, although men continued to spend more time in paid work and commuting than did women in 2005, the time women spent in these activities had increased substantially since 1986. And while women continued to devote more time to domestic activities than did men in 2005, the time men spent in these activities increased. These results are in line with other studies reporting that the gender division in domestic (unpaid) versus paid work—though not eliminated—may be narrowing.^{34,35} Sex differences in the prevalence of obesity in Canada have also narrowed over the past 15 to 20 years;²⁸ whether these trends are causally related is a topic for further exploration.

Overall, the amount of physically active leisure time increased among both sexes between 1986 and 2005, consistent with other reports.^{36,37} This would appear to be contrary to recent increases in the prevalence of obesity.⁶ Other studies, however, have acknowledged the

equivocal nature of the association.²⁹ noting, for instance, that leisure-time physical activity is only one aspect of overall energy expenditure.³⁸

Other plausible factors contributing to the upturn in obesity prevalence are an increase in the number of meals eaten in restaurants (which tend to be higher in calories than meals prepared at home³⁹) and a decrease in sleep.²⁹ The General Social Survey time-use data in this study, however, do not show such patterns across the sample as a whole, nor did an earlier analysis of these data that looked specifically at sleep.⁴⁰ It is possible that changes in these behaviours occurred, but the methods used in this analysis failed to pick them up. It is also possible that patterns in these activities by socio-economic characteristics are more important than results for the sample as a whole.

In fact, the binary logistic regression results in this analysis lend support to that possibility. In both years, higher-income men were more likely than lower-income men to spend time in paid work, commuting and eating out, and less likely to spend time sleeping. This time-use profile of higher-income men may help explain the positive association between income and BMI that has been observed for men in Canada.^{6,13,17,28} Such activities could promote weight gain through time trade-offs⁴¹ (for example, more time at work leaves less time for physical activity), higher calorie intake (if home-prepared meals are replaced by restaurant meals), and biological pathways associated with less sleep. In the context of Bourdieu's concept of *habitus*, larger body size for a higher-income man may reflect an array of bio-behavioural and social pathways, including a lifestyle in which activities outside the home predominate and a society that values physical presence in men.

The time-use pattern that emerges for higher-income women is similar to that for higher-income men in terms of paid work, commuting, eating out and sleeping. However, in contrast to the positive income-obesity association

among men, the association among women appears to be curvilinear.^{6,7} If the high-income lifestyle does, indeed, promote weight gain among men, why and how are women protected?

The disparity may be attributable to gender differences in the physical characteristics that are considered desirable.⁸ Because this analysis is based on personal (rather than household) income, the high-income women in the sample would mainly work outside the home. Compared with other women, they may be exposed to different norms with regard to weight, notably, implicit or explicit promotion of thinness.^{25,26} If these normative effects are opposite in direction to those for men,⁸ this may help explain why a comparable lifestyle profile yields different weight outcomes for high-income men and women. As well, the time-use data show that higher-income women were more likely than lower-income women to spend time in personal activities (for example, resting/relaxation and personal grooming), a difference that was not observed as consistently among men. Time spent on these activities may indicate greater concern about appearance.

For both sexes, education was positively associated with physically active leisure time (in 2005) and with reading in both years. Physical activity is consistent with, and may contribute to, lower obesity in men and women with higher education.^{6,8} That these associations were more clear-cut in 2005 than in 1986 echoes recent data that show widening gaps in physical activity by educational attainment.⁴² And although reading is physically inactive, it may be less conducive to weight gain than other sedentary leisure pursuits.⁴³ In relation to Bourdieu's concept of *habitus*, a portrait emerges of the educated adult as one for whom a slimmer body plausibly reflects an array of biological, behavioural, psychological and social pathways. These pathways might include a lifestyle characterized by physical activity and educational/cultural pursuits, and a resulting sense of control and empowerment. This, in turn, may

heighten the desire for and capacity to achieve well-being and a healthy weight within a social milieu where thinness, especially among women, is valued.

Limitations

The primary limitation of this study is the absence of data on body weight in the 1986 and 2005 General Social Survey. Nonetheless, the survey has other advantages: the ability to study a much broader array of daily activities than has been examined in earlier studies, and compared with other self-reported data, greater measurement validity for the assessment of behaviours.^{32,33}

The study focuses on individuals, which is contrary to recommendations that household units be studied when examining time use.^{34,44} Nonetheless, the findings are similar to those reported for dual-earner families,³⁴ which lends support to their validity.

Conclusion

The time-use data in this analysis provide a starting point for a holistic exploration of class, lifestyle and weight and demonstrate the value of adopting a broader view of lifestyle in research on the social drivers of health outcomes. The time-use patterns that emerge plausibly contribute to the social gradient in obesity reported in other Canadian studies. The results illustrate the benefits of looking beyond a narrow range of health behaviours toward broader measures of daily routines to gain insight into the social determinants of weight and health. ■

Acknowledgments

Lindsay McLaren is supported by a Population Health Investigator Award and Establishment Grant from the Alberta Heritage Foundation for Medical Research.

References

- Commission on the Social Determinants of Health. *Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health*. Final Report of the Commission on the Social Determinants of Health. Geneva: World Health Organisation, 2008.
- Marmot M. *The Status Syndrome*. New York: Henry Holt, 2004.
- Mackenbach JP, Stirbu I, Roskam AJR, et al. Socioeconomic inequalities in health in 22 European countries. *New England Journal of Medicine* 2008; 358: 2468-81.
- Shaw M, Galobardes B, Lawlor DA, et al. *The Handbook of Inequality and Socioeconomic Position: Concepts and Measures*. Bristol, United Kingdom: The Policy Press, 2007.
- McLaren L. Socioeconomic status and obesity. *Epidemiologic Reviews* 2007; 29: 29-48.
- Tjepkema M. Adult obesity. *Health Reports* (Statistics Canada, Catalogue 82-003) 2006; 17: 9-25.
- Kuhle S, Veugelaers PJ. Why does the social gradient in health not apply to overweight? *Health Reports* (Statistics Canada, Catalogue 82-003) 2008; 19: 7-15.
- McLaren L, Godley J. Social class and body mass index among Canadian adults: A focus on occupational prestige. *Obesity* 2009; 17: 290-9.
- Ward H, Tarasuk V, Mendelson R. Socioeconomic patterns of obesity in Canada: modeling the role of health behaviour. *Applied Physiology, Nutrition, and Metabolism* 2007; 32: 206-16.
- Ball K, Mishra GD, Crawford D. Social factors and obesity: an investigation of the role of health behaviours. *International Journal of Obesity* 2003; 27: 394-403.
- Heraclides A, Witte D, Brunner EJ. The association between father's social class and adult obesity is not explained by educational attainment and an unhealthy lifestyle in adulthood. *European Journal of Epidemiology* 2008; 23: 573-9.
- Bibby R. *The Bibby Report: Social Trends Canadian Style*. Toronto: Stoddart, 1995.
- Ross NA, Tremblay S, Khan S, et al. Body mass index in urban Canada: Neighbourhood and metropolitan area effects. *American Journal of Public Health* 2007; 97(3): 500-8.
- O'Brien M. Health and lifestyle: a critical mess? Notes on the differentiation of health. In: Bunton R, Nettleton S, Burrows R, eds. *The Sociology of Health Promotion: Critical Analyses of Consumption, Lifestyle and Risk*. New York: Routledge, 1995.
- Bourdieu P. *Distinction: A Social Critique of the Judgement of Taste*. London: Routledge, 1984.
- Shilling C. *The Body and Social Theory, second edition*. London: Sage Publications, 2005.
- Power EM. An introduction to Pierre Bourdieu's key theoretical concepts. *Journal for the Study of Food and Society* 1999; 3: 48-52.
- Power EM. Determinants of healthy eating among low-income Canadians. *Canadian Journal of Public Health* 2005; 96 (Suppl 3): S37-8.
- Bourdieu P. The forms of capital. In: Richardson JG, ed. *Handbook of Theory and Research for the Sociology of Education*. New York: Greenwood Press, 1986.
- Drewnowski A. Obesity and the food environment—dietary energy density and diet costs. *American Journal of Preventive Medicine* 2004; 27: 154-62.
- Tarasuk V. Health implications of food insecurity. In: Raphael D, ed. *Social Determinants of Health: Canadian Perspectives, second edition*. Toronto: Canadian Scholars' Press Inc., 2009.
- Moore S, Daniel M, Paquet C, et al. Association of individual network social capital with abdominal obesity, overweight and obesity. *Journal of Public Health* 2009; 31: 175-83.
- Wardle J, Waller J, Jarvis MJ. Sex differences in the association of socioeconomic status with obesity. *American Journal of Public Health* 2002; 92: 1299-304.
- Ross CE, Wu CL. The links between education and health. *American Sociological Review* 1995; 60: 719-45.
- McLaren L, Gauvin L. Neighbourhood- vs. individual-level correlates of women's body dissatisfaction: toward a multilevel understanding of the role of affluence. *Journal of Epidemiology and Community Health* 2002; 56: 193-9.
- McLaren L, Gauvin L. Does the 'average size' of women in the neighbourhood influence a woman's likelihood of body dissatisfaction? *Health and Place* 2003; 9: 327-35.
- Christakis NA, Fowler JH. The spread of obesity in a large social network over 32 years. *New England Journal of Medicine* 2007; 357: 370-9.
- Shields M, Tjepkema M. Trends in adult obesity. *Health Reports* (Statistics Canada, Catalogue 82-003) 2006; 17: 53-9.
- Keith SW, Redden DT, Katzmarzyk PT, et al. Putative contributors to the secular increase in obesity: exploring the roads less travelled. *International Journal of Obesity* 2006; 30: 1585-94.
- Sapolsky R M. *Why Zebras Don't Get Ulcers: The Acclaimed Guide to Stress, Stress-related Diseases, and Coping, third edition*. New York: Owl Books, 2004.
- Bjorntorp P. Do stress reactions cause abdominal obesity and comorbidities? *Obesity Reviews* 2001; 2: 73-86.
- Hamermesh DS, Frazis II, Stewart J. Data watch: the American time use survey. *Journal of Economic Perspectives* 2005; 19: 221-32.
- Tudor-Locke C, van der Ploeg HP, Bowles HR, et al. Walking behaviours from the 1965-2003 American Heritage Time Use Study (AHTUS). *International Journal of Behavioral Nutrition and Physical Activity* 2007; 4: 1479-88.
- Beaujot R, Liu J. Models of time use in paid and unpaid work. *Journal of Family Issues* 2005; 26: 924-46.
- McFarlane S, Beaujot R, Haddard T. Time constraints and relative resources as determinants of the sexual division of domestic work. *Canadian Journal of Sociology* 2000; 25: 61-82.
- Craig CL, Cameron C. *Increasing Physical Activity: Assessing Recent Trends from 1998-2003*. Ottawa: Canadian Fitness and Lifestyle Research Institute.
- Craig CL, Russell SJ, Cameron C, Bauman A. Twenty-year trends in physical activity among Canadian adults. *Canadian Journal of Public Health* 2004; 95: 59-63.
- Shields M, Tremblay MS. Sedentary behaviour and obesity. *Health Reports* (Statistics Canada, Catalogue 82-003) 2008; 19: 19-30.
- French SA, Story M, Jeffery RW. Environmental influences on eating and physical activity. *Annual Review of Public Health* 2001; 22: 309-35.
- Williams C. You snooze, you lose? Sleep patterns in Canada. *Canadian Social Trends* (Statistics Canada, Catalogue 11-008) 2001; Spring: 10-4.
- Harvey AS, Mukhopadhyay AK. When twenty-four hours is not enough: time poverty of working parents. *Social Indicators Research* 2007; 82: 57-77.
- Smith P, Frank J, Mustard C. Trends in educational inequalities in smoking and physical activity in Canada: 1974-2005. *Journal of Epidemiology and Community Health* 2009; 63: 317-23.
- Kaiser Family Foundation. *The Role of Media in Childhood Obesity: Issue Brief*. Menlo Park, California: The Henry J. Kaiser Family Foundation, 2004.
- Winkler A. Measuring time use in households with more than one person. *Monthly Labor Review* 2002; 125(2): 45-52.

Appendix

Table A
Derived time-use variables: groupings, examples of constituent items, and examples of possible pathways linking activity with body weight

Derived time-use variable	Examples of constituent items	Examples of possible pathways linking activity with body weight
Paid work	• work for pay • overtime	• physical (in)exertion • psycho-social stress • social norms
Commuting	• travel to/from work (one item only)	• physical (in)exertion
Household work	• dusting/vacuuming • laundry • outdoor cleaning	• physical exertion
Food preparation/Meals at home	• meal preparation • food/meal cleanup	• caloric intake
Restaurant meals/Eating out	• restaurant meals • meals/snacks at work	• caloric intake
Shopping/Services	• everyday shopping (for example, food, clothing) • personal care (for example, hairdresser)	• caloric intake • physical (in)exertion
Caregiving	• baby/child care • care of household adults	• physical exertion • psycho-social stress
Civic, voluntary, religious activities	• child/youth/family organization • fraternal/social organization • political/civic activities	• psycho-social stress • social norms
School/Education	• full-time classes • special/occasional lectures • homework	• physical (in)exertion • psycho-social stress • social norms
Personal activities and care	• washing, dressing • resting, relaxing	• psycho-social stress • other biological pathways
Sleep	• essential sleep • naps, incidental sleep	• other biological pathways
Socializing	• socializing (private residence) • socializing (bars, clubs)	• psycho-social stress • caloric intake • social norms
Entertainment (attend)	• sports events • pop music, concerts • museums, art galleries	• psycho-social stress • physical (in)exertion
Leisure (physically active)	• sports (football, tennis) • walk/hike • physical exercise (yoga, aerobics)	• physical exertion
Leisure (less physically active)	• hobbies, crafts • playing music	• psycho-social stress • physical in exertion
Television/Computer	• video games • surfing the web/e-mail • watching TV	• physical in exertion • caloric intake
Reading	• reading books • reading magazines, newspapers	• physical in exertion
Other	• no activity reported • codes overlap two or more above groupings	• not applicable

Source: 1986 and 2005 General Social Survey.